We Claim:

1. An electrohydraulic clutch assembly comprising, in combination,

an input member and a coaxially disposed output member,

a bi-directional electric motor,

a gear train having an input driven by said electric motor and an output,

a ball screw driven by said output and driving a first piston displacing hydraulic fluid,

a second piston translated by said hydraulic fluid, and

a friction clutch pack operably disposed between said input member and said output member and actuated by said second piston.

2. The electrohydraulic clutch assembly of claim 1 further including means for inhibiting back driving of said electric motor.

3. The electrohydraulic clutch assembly of claim 2 wherein said inhibiting means includes a wrap spring disposed within a cylindrical passageway and extending between a drive hub and a driven pinion.

4. The electrohydraulic clutch assembly of claim of 1 further including a pressure sensor for providing a signal representing a pressure of hydraulic fluid generated by said first piston.

5. The electrohydraulic clutch assembly of claim 1 further including a microprocessor having an output adapted to bi-directionally drive said electric motor.

6. The electrohydraulic clutch assembly of claim 1 wherein said friction clutch pack includes a first plurality of clutch plates coupled to said input member and a second plurality of clutch plates interleaved with said first plurality of clutch plates and coupled to said output member.

7. The electrohydraulic clutch assembly of claim 1 further including a circular apply plate and a thrust bearing both disposed between said second piston and said friction clutch pack.

8. An electrohydraulic clutch assembly comprising, in combination, an input member and a coaxially disposed output member,

an electric motor,

a master piston,

a rotary motion to linear motion transducer operably driven by said electric motor and driving said master piston,

a friction clutch pack operably disposed between said input member and said output member, and

a slave piston in fluid communication with said master piston and acting upon said friction clutch pack.

9. The electrohydraulic clutch assembly of claim 8 further including means for inhibiting back driving of said electric motor.

10. The electrohydraulic clutch assembly of claim 9 wherein said inhibiting means includes a wrap spring disposed within a cylindrical passageway and extending between a drive hub and a driven pinion.

11. The electrohydraulic clutch assembly of claim of 8 further including a pressure sensor for providing a signal representing a pressure of hydraulic fluid generated by said master piston.

12. The electrohydraulic clutch assembly of claim 8 further including a microprocessor having an output for bi-directionally driving said electric motor.

13. The electrohydraulic clutch assembly of claim 8 wherein said friction clutch pack includes a first plurality of clutch plates coupled to said input member and a second plurality of clutch plates interleaved with said first plurality of clutch plates and coupled to said output member.

14. The electrohydraulic clutch assembly of claim 8 further including a circular apply plate and a thrust bearing both disposed between said slave piston and said friction clutch pack.

15. An electrohydraulic clutch assembly for motor vehicle drivelines, comprising, in combination,

a bi-directional electric motor,

a gear train having in input driven by said electric motor and an output,

a ball screw assembly driven by said output of said gear train,

a first piston bi-directionally translated by said ball screw assembly,

a second piston in fluid communication with said master piston and,

a friction clutch pack having an input and an output and acted upon by said second piston.

16. The electrohydraulic clutch assembly of claim 15 further including means for inhibiting back driving of said electric motor.

17. The electrohydraulic clutch assembly of claim 16 wherein said inhibiting means includes a wrap spring disposed within a cylindrical passageway and extending between a drive hub and a driven pinion.

18. The electrohydraulic clutch assembly of claim 17 wherein said inhibiting means includes a wrap spring disposed within a cylindrical passageway and extending between a drive hub and a driven pinion, wherein said drive hub and said driven pinion including a coupling accommodating limited relative rotation.

19. The electrohydraulic clutch assembly of claim of 15 further including a pressure sensor for providing a signal representing a pressure of hydraulic fluid generated by said master piston.

20. The electrohydraulic clutch assembly of claim 15 further including a microprocessor having an output adapted to bi-directionally drive said electric motor.

21. The electrohydraulic clutch assembly of claim 15 wherein said friction clutch pack includes a first plurality of clutch plates coupled to said input member and a second plurality of clutch plates interleaved with said first plurality of clutch plates and coupled to said output member.

22. The electrohydraulic clutch assembly of claim 15 wherein said output of said friction clutch pack provides drive torque to a differential in a motor vehicle driveline.

23. The electrohydraulic clutch assembly of claim 15 further including a circular apply plate and a thrust bearing both disposed between said second piston and said friction clutch pack.